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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,983	09/25/2001	David A. Zumbrunnen	CXU-336PA	3306

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EXAMINER
NOLAN, SANDRA M

ART UNIT	PAPER NUMBER
1772	

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/963,983	Applicant(s) ZUMBRUNNEN ET AL.	
	Examiner Sandra M. Nolan	Art Unit 1772	

-- The MAILING DATE of this communication appears on the c ver sheet with the correspondence address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-231* is/are pending in the application.

4a) Of the above claim(s) *1-28,55-106,184-197 and 203-231* is/are withdrawn from consideration.

5)☒ Claim(s) *162-183* is/are allowed.

6)☒ Claim(s) *29-38, 40, 42-44, 47-54, 107-120, 122-130, 133-134, 137-144, 147-151,155, 158-159 and 198-202* is/are rejected.

7)☒ Claim(s) *39,41,45,46,121,131,132,145,146,152-154,157,160,161 and 1546* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

DETAILED ACTION

Claims

1. Claims 1-231 are pending.

Election/Restrictions

2. Applicant's election with traverse of Group II, claims 29-54, 107-183 and 198-202, in Paper No. 6 (the response dated 28 April 2003) is acknowledged. The traversal is on the ground(s) that the independent claims are variations of the basic chaotic process and not separate and distinct inventions. This is not found persuasive because the inventions as grouped have divergent fields of search and the processes used in some groups need not produce the articles recited in others. Note that the claimed mixing operations can be used to melt mix polymer particles of differing molecular weights, yielding blends that would not necessarily be composites having the shapes/morphologies recited in the article claims.

3. The requirement is still deemed proper and is therefore made FINAL.

4. This application contains claims 1-28, 55-106, 184-197 and 203-231, drawn to inventions nonelected with traverse in Paper No. 6. A complete reply to any final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

5. Claims 29-54, 107-183 and 198-202 are treated in this office action.

Information Disclosure Statement

6. The information disclosure statement (IDS) submitted on 11 February 2002 and 05 March 2002 (Papers 2 and 3) was considered by the examiner.

Allowable Subject Matter

7. Claims 162-183 are allowed. The prior art of record fails to teach or suggest processes having all of the features of base claims 162 and 167.

8. Claims 39, 41, 45-46, 121, 131-132, 135-136, 145-146, 152-154, 156-157 and 160-161 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 29-33, 35-38, 43, 47, 50-53, 107,117-120, 122-130, 137, 138, 140-144, 147-151, 155, 158-159 and 198-201 are rejected under 35 U.S.C. 102(b) as being anticipated by Zumbrunnen (Proceedings of the 4th Experimental Chaos Conference, pp. 223-228, August 4-6, 1997).

The Zumbrunnen publication describes the sue of extruders to blend polymers, with the production of droplets in the molten minor phase (page 223, first paragraph). The formation of lamellar composites is discussed (page 223, second paragraph). The use of two- and three-dimensional mixing of melts is taught (page 223, last full sentence). The samples used in the study were studies solidified by cooling, machining the solid mass and examining the surfaces with a microscope (page 224, lines 13-21).

The mixing of polymers of various types is taught (page 225, first full paragraph). The mixing of polymer melts with carbon black is discussed in the paragraph bridging pages 225 and 226. Figure 3 (page 226) shows layers of carbon black in polystyrene. On page 227, improvements in impact strength were noted for composites containing lamellae, fibers and droplets (see lines 6-11).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 34, 40, 42, 44, 48 and 108-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zumbrunnen.

Zumbrunnen is discussed above.

It fails to teach the nonpolymeric material of claim 34, the use of a combination of two and three dimensional mixing per claim 40, the delivery of the samples to die for forming/aligning per claims 42 and 44, the termination of the chaotic mixing to give a

predetermined thickness per claim 48, or the thickness and number of layers recited in claims 108-116.

It is deemed a matter of engineering choice to select suitable materials to be mixed, devices that provide dies, thicknesses and/or number of layers in lamellae/striations when making the composites of Zumbrunnen. Such selections are deemed optimizations within the purview of one of ordinary skill in the art. See in re Petersen, 65 USPQ2d 1379 (Fed.Cir. January, 2003).

14. Claims 49-50 and 133-134 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zumbrunnen as applied to claims 29-33, 35-38, 43, 47, 50-53, 107,117-120, 122-130, 137, 138, 140-144, 147-151, 155, 158-159 and 198-201 above, and further in view of Zhang et al (AIChE Journal, vol. 42, No. 12, pages 3301-3308, December, 1996).

Zumbrunnen is discussed above. It fails to teach the mixing of three fluids.

Zhang teaches that three fluids can be mixed chaotically (title). In the conclusions, on page 3308, it teaches that the presence of a third material may facilitate the mixing of two others.

The references are analogous because they both deal with chaotic mixing.

It would have been obvious to one having ordinary skill in the art at the time that the invention was made to employ the three fluids of Zhang in the chaotic mixing process of Zumbrunnen in order to combine more than two materials.

The motivation to employ the three fluids of Zhang in the process of Zumbrunnen is found in the conclusions of Zhang, where Zhang says that the presence of a third material is believed to facilitate the mixing of the other two.

The selection of polymers as all three materials is a matter of engineering choice.

15. Claims 54 and 139 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zumbrunnen as applied to claims 29-33, 35-38, 43, 47, 50-53, 107,,117-120, 122-130, 137, 138, 140-144, 147-151, 155, 158-159 and 198-201 above, and further in view of Zumbrunnen et al (Composites, part A, vol. 27A, No. 1, 1996).

Zumbrunnen is discussed above. It fails to teach the formation of holes in its composites.

Zumbrunnen et al teaches, page 46, line 2, the production of holes left by slicing its chaotically mixed fiber-containing specimens.

The references are analogous because they both discuss chaotic mixing.

It would have been obvious to one having ordinary skill in the art at the time that the invention was made to employ processes that yield the holes of Zumbrunnen et al in the composites in order to lower the cost and the weight of the materials produced.

The motivation to produce the holes of Zumbrunnen et al in the composites of Zumbrunnen is found at page 46, line 2 of Zumbrunnen et al, where the production of holes from fiber-containing mixed materials is discussed.

It is deemed desirable to lower the cost of composites by introducing holes into them in order to save money because of the smaller amounts of polymeric materials

used. It is deemed desirable to lower the weight of composites by introducing holes into them in order to lower shipping and handling costs for the products made.

16. Claim 202 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zumbrunnen as applied to claims 29-33, 35-38, 43, 47, 50-53, 107,117-120, 122-130, 137, 138, 140-144, 147-151, 155, 158-159 and 198-201 above, and further in view of Jana et al (US 6,132,076).

Zumbrunnen is discussed above. It fails to teach the use of rubbers as one the materials mixed via its process.

Jana shows that rubber can be mixed into melts in extruders (col. 5, lines 47-48).

The references are analogous because they both deal with melt mixing in extruders.

It would have been obvious to one having ordinary skill in the art at the time that the invention was made to employ the rubber of Jana as one of the polymeric materials used in the chaotic mixing process in the extruder of Zumbrunnen in order to produce articles having properties attributable to rubbers.

The motivation to employ the rubber of Jana in the process of Zumbrunnen is found at col. 5, lines 46-48 of Jana, where the mixing of rubber in the melt is discussed.

It is deemed desirable to make articles having the properties of rubber by employing rubbers as polymers to be mixed in chaotic mixing processes since rubbers are known to be difficult to process as melts.

Conclusion

Any inquiry concerning this communication should be directed to the Examiner, Sandra M. Nolan, whose telephone number is 703/308-9545. The Examiner can normally be reached on Monday through Thursday, from 6:30 am to 4:00 pm, Eastern Time.

If attempts to reach the Examiner by telephone are unsuccessful, her supervisor, Harold Pyon, can be reached at 703/308-4251. The general fax number for the art unit is 703/305-5436. The fax number for after final communications is 703/872-9310. The receptionist answers 703/308-0661.

S. M. Nolan
Patent Examiner
Technology Center 1700

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